

Arizona. Artificial hybrids of *H. neglectus* with several other species are discussed.—DEPARTMENT OF BOTANY, INDIANA UNIVERSITY, BLOOMINGTON, IND.

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DESCRIPTION, DISTRIBUTION AND ECOLOGY OF
THREE SPECIES OF VAUCHERIA PREVIOUSLY
UNKNOWN FROM NORTH AMERICA

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During the period from June to November, 1955, a survey was made of the distribution and ecology of attached marine algae along the coast of the Labrador peninsula. Collections were made from the mouth of the Koksoak River, Quebec, northward along the western side of the Labrador peninsula to Port Harvey, Killinek Is., Quebec, and in a less extensive area in the regions of Hebron and Saglek, Labrador. Collected materials from the mouth of the Koksoak River and False River Bay, Quebec, show three species of *Vaucheria* previously unknown from North America.¹

The writers express their gratitude to Dr. I. Mackenzie Lamb, Director of the Farlow Library and Herbarium, Harvard University, for the loan of the type material of *Vaucheria compacta* (Collins) Collins, and to Dr. David Irvine, who provided preserved material of *V. sphaerospora* Nordstedt collected in Scotland.

Intertidal areas of southeastern and southwestern Ungava Bay, especially at the heads of fjords and bays and near the mouths of larger rivers and streams, take the form of broad,

¹ Specimens of the described species have been deposited in the New York Botanical Garden and the herbarium of the University of Michigan.

expansive, boulder-strewn mud flats as a result of enormously high tides, the low relief of the surrounding watershed, and the tremendous discharge of silt from rivers and other streams. In such habitats, uncommon in the area investigated, silty mud covers much of the shore between tides and, in regions of quiet water, extends well into the sublittoral. A dense, wide-spreading carpet or mat of *Vaucheria* filaments is common on these mud flats. Frequently, colonies of these plants are continuous for several square meters or more in extent, penetrating the silt and grit only slightly, but becoming strongly infiltrated with it so that the mat assumes considerable firmness. The overall appearance of the mat is dark green, becoming a glistening black when covered with water, and at that time, extremely slippery.

At the two stations² where these plants were seen the colonies were so located that at low water level, in most instances, all of the mat would be exposed for varying periods of time. In the most sheltered regions, where the water is continually quiet, small patches of the mat may extend into the upper sublittoral. The latter patches are subject to exposure only during low spring tides.

In addition to the *Vaucheria* species, a few other marine algae are present in this community, but are far less conspicuous. Among these are *Gloeocystis scopulorum* Hansgirg, *Urococcus foslicanus* Hansgirg and *Calothrix scopulorum* Drouet and Daily.

Vaucheria sphaerospora Nordstedt (fig. 1, 2). This well known European species, fruiting abundantly, was collected in quantity. It was apparently the dominant element of the mat. The measurements of the Quebec material correspond well with those given by Nordstedt (1878) in his description of this species. *V. sphaerospora* is distinctive in possessing a special fruiting branch which bears an oogonium and a single antheridium which curves toward the oogonium. This species is the only Pilo-boloidean *Vaucheria* possessing this combination of characters.

The oogonium is formed from the fruiting branch immediately below the suffultory cell which subtends the antheridium, much as in *V. intermedia* Nordstedt and *V. minuta* Blum and Conover. As the cylindrical oogonial filament becomes laterally distended

² *Wilce* 830, September 1, 1955, near the mouth of the Koksoak River, eastern shore; *Wilce* 844, September 4, 1955, toward the head of False River Bay on the western side.

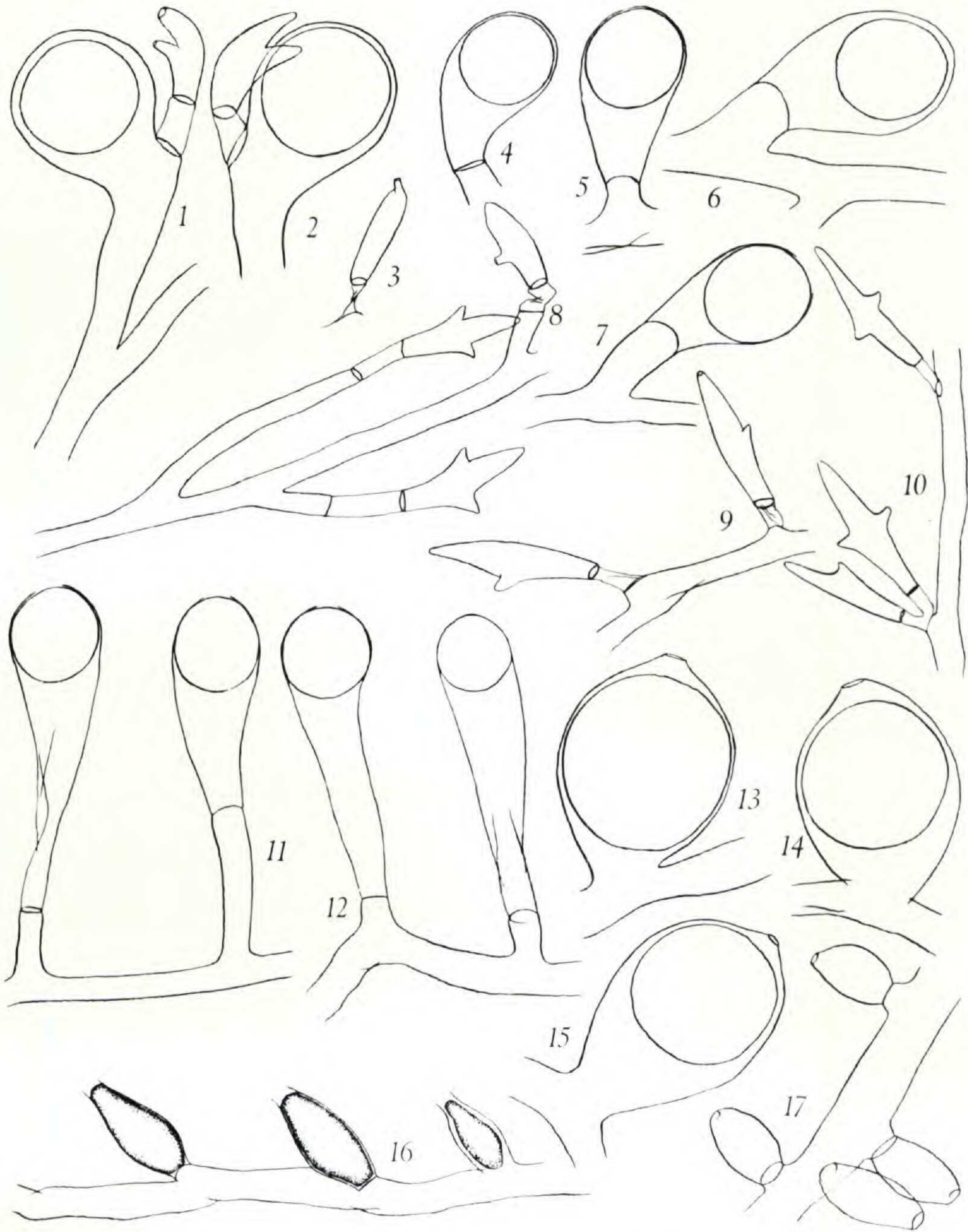


FIG. 1-17 VAUCHERIA. Fig. 1 & 2 *Vaucheria sphaerospora*. Fig. 3-8 *V. compacta*; fig. 3-5 drawn from type material in the Farlow Herbarium of Harvard University; Mystic River marshes, Malden, Mass., Sept. 1897 (*F. S. Collins 477*); fig. 3 Antheridium; fig. 4 & 5 Oogonia; fig. 6-8 drawn from material collected in Great Pond, Falmouth, Mass. (*J. T. Conover, 53-6*); fig. 6 & 7 Oogonia; fig. 8 Antheridium. Fig. 9-12 *V. compacta* var. *koksoakensis*; fig. 9 & 10 Antheridia; fig. 11-12 Oogonia. Fig. 13-17 *V. submarina*; fig. 13-15 Oogonia; fig. 16 & 17 Antheridia. All figures about 90X.

in the formation of the oogonium, the antheridium and the subtending suffultory cell lose their terminal position and thus appear to constitute a lateral offshoot of the mature oogonium (fig. 2). A wide terminal pore eventually forms at the upper end of the oogonium. The spherical oospore possesses at maturity a wall varying from 1–4 μ in thickness and does not quite fill the oogonium. The antheridium is fusiform or conical at maturity, its upper end narrowing to its terminal pore. Other pores, numbering 1–4, are at the ends of the papillae, one or more of which may equal or exceed the terminal papilla or upper end of the antheridium in length. The entire antheridium lies parallel to and closely adjacent or appressed to the oogonium. The terminal papilla of the antheridium curves toward the upper end of the oogonium and the papillae other than the terminal one are mostly found on the side of the antheridium adjacent to the oogonial pore, and are more or less directed toward it.

Vegetative filaments 28–53 μ in diameter; oogonium 87–178 \times 214–386 μ ; oospore 86–144 μ in diameter; antheridium 38–57 \times 128–157 μ ; antheridial papillae 14–33 (–45) μ in length; antheridial suffultory cell 50–57 μ in length.

***Vaucheria compacta* var. *koksoakensis* var. nov.** (fig. 9–12). A typo differt in oogonia longiora. Differs from the type in the greater length of the oogonia.

V. compacta (Collins) Collins has been collected in eastern United States (Collins 1900, Blum and Conover 1953), and in western Europe (*vide* Christensen 1952). It is dioecious, with both oogonia and antheridia borne at the ends of short erect branches which occur in short series arising from the vegetative filaments. The oogonium is essentially cylindrical but is greatly swollen at its upper end where the spherical oospore is present. Below the oospore the mature oogonium is empty. The stalk which bears the antheridium occasionally sends out a branch, in such a way that the antheridial branch bears two antheridia (fig. 10). Antheridia dehisce by two or three pores which terminate conical papillae, one of which is always terminal.

In the type material of *V. compacta* (fig. 3–5), and in the material of *V. compacta* from Massachusetts (*J. T. Conover* 53–6, east shore marsh, Great Pond, Falmouth, Barnstable Co., Jan. 31, 1953, fig. 6–8), the length of the oogonium averages 1.5–2.5

× the length of the oospore (fig. 4–7). In the material of *V. compacta* var. *koksoakensis* the oogonium is much longer, averaging from 3–4 × the length of the oospore (fig. 11–12); thus its appearance is significantly different from that of the type. Although this difference could be due to environmental factors, on the basis of the available data it seems nevertheless preferable not to regard this material as typical *V. compacta*.

Measurements of the Quebec material are as follows: Vegetative filaments 21–50 μ in diameter; oogonium 87–128 × 235–357 μ ; oospore 92–100 (–114) μ ; antheridium 24–48 × 128–186 μ ; papilla of antheridium 8–27 μ in length; suffultory cell 28–65 μ in length; total length of the oogonium with its subtending stalk 214–429 μ .

Vaucheria submarina Berk. *sensu* De Wildeman 1899 (fig. 13–17). Adequate knowledge of the widespread *V. dichotoma* Ag. and of its forms or varieties, if any, awaits further study. *V. submarina* is certainly closely related to *V. dichotoma* and may be referable to one of the described forms of the latter, such as Hauck's *V. dichotoma* f. *marina*, although the brief original description of the latter form renders the name essentially ambiguous. Berkeley, in an even less satisfactory description than Hauck's, raised *V. dichotoma* f. *marina* to specific rank, *V. submarina* Berk. De Wildeman, in his *Algues de la Flore de Buitenzorg* (1900) used the name *V. submarina* Berk. in a precise way, and from De Wildeman's description it is possible to identify *V. submarina* as one of the species from the Quebec collections. These plants seem to correspond in all essential respects with the material collected by De Wildeman in Java. Our material was found as a sparse admixture in the *V. sphaerospora* stratum.

This species, like *V. dichotoma*, is apparently dioecious, the subspherical oogonia being borne singly (in our material) on a short stalk directly upon the horizontal vegetative filaments, and the bottle-shaped, fusiform or cylindric antheridia being borne in uni- or multilateral series, on filaments separate from those which bear oogonia. Our material is strikingly smaller than *V. dichotoma* in the size of the vegetative filaments, and is further unlike that species in the spherical shape of the oospore, which fills a relatively smaller portion of the oogonium. In *V. dichotoma* the entire oogonium is usually filled by the oospore.

Vegetative filaments (35-) 50-84 (-100) μ in diameter; oogonium 185-228 \times 186-314 μ ; oogonial pore about 12-40 μ in diameter; oospore (130-) 171-186 \times (150-) 171-200 μ ; antheridia 43-71 \times 114-200 μ .

SUMMARY

Collections of tidal Vaucheriae gathered in the Ungava Bay region of northern Quebec are described and brief notes on their habitat are given. *Vaucheria sphaerospora* and *V. submarina* are considered to be new to the North American flora. A collection of *V. compacta* characterized by unusually long oogonia is described as *V. compacta* var. *koksoakensis*.—CANISIUS COLLEGE, BUFFALO, N. Y. AND DEPARTMENT OF BOTANY, UNIVERSITY OF MICHIGAN, ANN ARBOR, MICHIGAN.

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